Proposal Reviews

#235: Atmospheric Deposition of Pesticides to the San Joaquin River Basin

US Geological Survey

Initial Selection Panel Review	
Research and Restoration Technical Panel Review	
San Joaquin Regional Review	
External Scientific Review	#1 #2 #3 #4
Environmental Compliance	
Budget	

Initial Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Initial Selection Panel Review

Proposal Number: 235

Applicant Organization: US Geological Survey

Proposal Title: Atmospheric Deposition of Pesticides to the San Joaquin River Basin

Please provide an overall evaluation rating.

Explanation of Recommendation Categories: Fund

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

Consider as Directed Action in Annual Workplan (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)
Not Recommended (a proposal not currently recommended for funding-after revision may be considered in the future)

Note on "Amount":

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

Fund	
As Is	**-**
In Part	**-**
With Conditions	**-**
Consider as Directed Action	**-**
Not Recommended	**X**

Amount: **$0**

Conditions, if any, of approval (if there are no conditions, please put "None"):

None.

Provide a brief explanation of your rating:

The Selection Panel concurs with the Technical Panel evaluation. This is a proposal that could fill important data gaps relative to atmospheric deposition of pesticides into surface waters. It was not recommended for funding due to questions regarding the adequacy and applicability of sampling methods, the lack of available analytical methods for pyrethroids, and the desire to link the proposed work to pesticide flux models for the area.

Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Research and Restoration Technical Panel Review Form

Proposal Number: 235

Applicant Organization: US Geological Survey

Proposal Title: Atmospheric Deposition of Pesticides to the San Joaquin River Basin

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;
Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;
Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;
Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Superior	**This is a proposal that could address important data gaps pertaining to the environmental fate and transport of pesticides to surface waters and aquatic communities. It was not ranked highly because of questions about whether the sampling methods used were as good as they should be, whether analytical methods were available for the pyrethroids, and a desire to see this work linked to models of pesticide fluxes in the area.**
-Above average	
XAdequate	
-Not recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   The goals and objectives of this proposal are clearly stated. The fact that pesticides are transported to aquatic habitats via atmospheric deposition is well established. Consequently, it is likely that atmospheric deposition is an important contributor to surface water pesticide concentrations within the Valley itself, and to the San Joaquin river in particular. This is a descriptive proposal, and there are no specific hypotheses that will be tested, which posed problems for some reviewers, whereas others felt that this sort of data collection was highly warranted.

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

The project is basically a large scale sampling effort, with sample analyses to be carried out at the USGS National Water Quality Laboratory. The investigators have considerable expertise in the design of atmospheric sampling studies, and the panel felt that some of the sampling methods chosen for use did not reflect currently available superior methods. The project could fill information gaps concerning the fate and transport of pesticides to aquatic ecosystems, and this information should be useful to natural resource managers (i.e. the various parties working on pesticide TMDLs). However, the project would have been improved by better linkages to groups modeling these fluxes.

A problem is likely to be encountered in the measurement of pyrethroid insecticides which, as the investigators note, are replacing the organophosphates (the primary focus of the study) for use on various crops and urban/residential lands. Analytical detection methods for these chemicals are high and show a variable response. In addition, sample recovery for pyrethroids can be poor or highly variable. Therefore, the investigators may not be able to accurately measure the atmospheric deposition of pyrethroids, at least until new analytical methods have been developed. In a sense, this is unfortunate, because the pyrethroids are the "insecticides of the future" for the San Joaquin basin and the atmospheric deposition of these chemicals will inevitably become an important issue. However, at this time, the investigators should probably restrict their focus to pesticides that can be accurately detected in the parts-per-trillion range.

It was generally acknowledged that this group of investigators is capable of conducting the study as described.

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   The proposed research will result in several peer-reviewed publications and technical reports as appropriate. The data should provide for interpretive outcomes in the sense that decision-makers will have a more accurate and quantitative understanding of the relative role of atmospheric pesticide deposition in the degradation of water quality in the San Joaquin River. It was strongly felt on the part of some reviewers that this project would be much improved through a linkage to a detailed model of pesticide fluxes.

4. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The budget was reasonable overall, although expensive. A question was raised by one reviewer as to why 800 labor hours were allocated for the construction of relatively straightforward deposition boxes. How many are being built?

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

   This proposal was ranked as high by the one region which provided a review.

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

No significant issues raised

Miscellaneous comments:

None

San Joaquin Regional Review:

Proposal Number: 235

Applicant Organization: US Geological Survey

Proposal Title: Atmospheric Deposition of Pesticides to the San Joaquin River Basin

Overall Ranking: **-**Low **-**Medium **X**High

Provide a brief summary explanation of the committee's ranking:

This proposal is very specific, focusing on an mechanism of contamination that may be overlooked because it falls between air quality and water quality concerns. The careful attention to sampling methods should elucidate this means of transportation of contaminants from field to the aquatic system.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   This is a well-defined study proposing to examine a neglected mechanism of pesticide delivery. While it is focused on OP pesticides, it should be useful for all pesticides applied to agricultural systems in the Bay/Delta region.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   The proposal addresses the priority to ensure that restoration is not threatened by degraded environmental water quality.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   The proposal includes working closely with the Central Valley CRWQCB. The information gained will be useful in the development of best management practices, which will benefit water quality and therefore restoration efforts throughout the region.

4. Does the project adequately involve local people and institutions?

XYes **-**No

How?

Insofar as sampling sites are near sources of application, the authors will need to gain access to private land. The investigators have spoken with some of the landowners and gotten informal permission.

Other Comments:

It is suggested that the investigators develop a fuller list of analytes, specifically by referring to that developed by the CA Department of Pesticide Regulation.

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **235**

Applicant Organization: **US Geological Survey**

Proposal Title: **Atmospheric Deposition of Pesticides to the San Joaquin River Basin**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**This is a low-risk proposal that will address important data gaps pertaining to the environmental fate and transport of pesticides to surface waters and aquatic communities.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goals and objectives of this proposal are very clearly stated. The fact that pesticides are transported to aquatic habitats via atmospheric deposition is well established. It is interesting to note that agricultural pesticides from the Central Valley have been detected in rain and snow in the Sierra Nevada mountains, including Lake Tahoe and Sequoia National Park [i.e. McConnell et al., 1998. Wet deposition of current-use pesticides in the Sierra Nevada mountain range, California, USA. Environ. Tox. Chem. 17:1908-1916]. Consequently, it is very likely that atmospheric deposition (wet and dry) is an important contributor to surface water pesticide concentrations within the Valley itself, and to the San Joaquin river in particular.

This is a descriptive proposal, and there are no specific hypotheses that will be tested. Rather, the project will focus on the collection of pesticides (mostly organophosphates and their transformation products) in different matrices and the analyses of the samples by the USGS National Water Quality Laboratory. Overall, the study design is straightforward and the tasks are internally consistent.

Understanding the role of atmospheric deposition as a vehicle for pesticide transport to aquatic systems is very important. For example, atmospheric deposition may be a significant source of pesticides in stormwater runoff, particularly in geographical areas that are removed from the original site of application. Moreover, a more accurate understanding of atmospheric deposition is critical for the development of pesticide TMDLs for the San Joaqin River.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   The study is justified relative to existing knowledge. An improved understanding of atmospheric pesticide deposition is needed, and the investigators are proposing a direct and feasible project for collecting new empirical data. A particular strength of the proposal is the analysis of pesticides from dry vs. wet deposition and in different phases. The scale and selection of research is appropriate to address the specific aims and scope of the project.

   Rating--excellent

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The project is basically a large scale sampling effort, with sample analyses to be carried out at the USGS National Water Quality Laboratory. The investigators have considerable expertise in the design of atmospheric sampling studies, and the monitoring work they propose should collect the data needed to achieve the project's objectives. The project is likely to important fill information gaps concerning the fate and transport of pesticides to aquatic ecosystems, and the information should be useful to natural resource managers (i.e. the various parties working on pesticide TMDLs).

   Rating--excellent

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   This is a low-risk project. The sampling methods for the organophosphates are sound, and the analytical methods for measuring trace concentrations of pesticides have been worked out by the USGS and other agencies. The likelihood of success is therefore high.

   One possible exception is the measurement pyrethroid insecticides which, as the investigators note, are replacing the organophosphates (the primary focus of the study) for use on various crops and urban/residential lands. Analytical detection methods for these chemicals are high and show a variable response. In addition, sample recovery for pyrethroids can be poor or highly variable. Therefore, the investigators may not be able to accurately measure the atmospheric deposition of pyrethroids, at least until new analytical methods have been developed. In a sense, this is unfortunate, because the pyrethroids are the "insecticides of the future" for the

San Joaquin basin and the atmospheric deposition of these chemicals will inevitably become an important issue. However, at this time, the investigators should probably restrict their focus to pesticides that can be accurately detected in the parts-per-trillion range.

Rating--very good

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   The performance measures for this project are appropriate.

   Rating--excellent

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   The proposed research will result in several peer-reviewed publications and technical reports as appropriate. The data should provide for interpretive outcomes in the sense that decision-makers will have a more accurate and quantitative understanding of the relative role of atmospheric pesticide deposition in the degradation of water quality in the San Joaquin River.

   Rating--very good

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The applicants are well qualified to implement the work as proposed. The USGS in particular is uniquely suited to carry out studies involving pesticide sampling and analyses.

   Rating--excellent

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Overall, yes. One minor point: the construction of the dry deposition/runoff soil box sample collectors seems straightforward and relatively inexpensive (e.g. plywood, soil, aluminum tray, drain hole, and mesh wire screen). Why have the investigators budgeted 800 direct labor hours to build these in Task 1?

   Rating--very good

Miscellaneous comments:

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **235**

Applicant Organization: **US Geological Survey**

Proposal Title: **Atmospheric Deposition of Pesticides to the San Joaquin River Basin**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

<u>Excellent:</u> outstanding in all respects;
<u>Good:</u> quality but some deficiencies;
<u>Poor:</u> serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Excellent	**I believe that this proposal merits funding based on the important issue that it seeks to address. The proposal arises logically from the literature and past work done by the proponents. The intended output from the research is closely related to the needs of Ecosystem Restoration Program. The proposed research is connected with other efforts (e.g., measurements of river water quality). The track record of the proponents is excellent. There is every belief that the proponents will deliver useful and valuable data and interpretations. On all these accounts, the proposal is very strong. As mentioned above, the proposal could be strengthened by identifying hypotheses and relating them to specific objectives and methods. I have some concerns regarding the methods used.**
XGood	
-Poor	

1. **<u>Goals.</u>** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The concept and overall objective are clearly stated and mostly consistent. The overall aim is stated and the objective arises clearly from the aim. The proposal could be improved by stating hypotheses and objectives related to each stage of the methods proposed. The concept is extremely timely and important. The importance of atmospheric deposition in terms of chemical loading has been demonstrated for many systems. Any determination of TMDLs

and devising strategies to improve water quality in the San Joaquin River must incorporate information on atmospheric contributions. The proponents are correct in addressing the issue of spatial and temporal variability in deposition. The effort to distinguish between agricultural and urban atmospheric depositional loads is also important, however the proposal would be strengthened by an attempt to distinguish between these source areas, e.g., what is the contribution from local residential pesticide usage versus regional atmospheric transport to total deposition in the urban area?

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   The proposed research is justified based on the lack of knowledge relating atmospheric pesticide concentrations and runoff to surface waters, particularly for different land uses (agricultural versus urban). This knoweldge is essential in order to achieve the aim of improving water quality through the control of specific sources. The conceptual model could be more clearly developed and, as mentioned above, this could be in part accomplished by the statement of hypotheses and specific research questions that lead from the aim and overall objective to methods. Parts of the research plan are not fully justified, such as the need for multiple sampling methods (e.g., several methods are used to quantify wet and dry deposition).

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   Generally, the approach is reasonably well designed and is tailored to meet the objective. The results will undoubtedly contribute to our scientific knowledge base (the linkage between wet and dry deposition and runoff as a function of space, time and land use). The approach will also meet the management need of quantifying this contribution to total loadings so that reasonable source reduction goals can be established. It is possible that new methods may be developed, however I have some concerns about those methods (listed below). The novel information arising from the proposed work will be a comprehensive data set that addresses several factors. The approach to data analysis is not adequately described, which is an important component of the study. It would be useful to list the pesticides and other compounds that will be measured.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   Methods are reasonably well described, except for the statistical analysis. I have several concerns about the methods used. For example, the use of soil boxes to quantify dry gaseous and particulate deposition may be problematic. Wind erosion will probably remove soil at different rates at different sites (even though the soil is covered by a wire screen) and the soil in each box will differ in surface area and thus contribute to uncertainties in deposition rates (since gaseous and particle dry deposition is very sensitive to surface area). How do the aerodymanic features of a stainless steel bucket influence dry deposition rates and since it is stainless steel? The surface will have a significantly higher temperature than surrounding surfaces that may bias gaseous and particle deposition rates. There is no mention of assessing whether the gaseous components collected in the PUF sheet will reach equilibrium, which is necessary in order to interpret the data. Alternatively, the uptake rate for the PUFs must be calibrated. For the runoff measurements, how will the proponents correct for differential loss rates of fines from the draining soil? How will the loss of fines with each rain event change pesticide runoff rates? The

soil must be characterized for organic matter content, grain size distribution, etc., details of which are not mentioned in the proposal. The deployment of the various collectors at specific sampling sites is not well described.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   The proposal contains an appropriate accounting of milestones that relate back to the project's objective. This aspect of the proposal could also benefit from having hypotheses and detailed objectives, each of which should have their corresponding milestones. QA/QC methods for chemical analysis are well described and the proponents have an excellent track record in this regard. In general, this aspect of the proposal is well formulated.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   The "product" of value is scientific knowledge and data that will aid in efforts to improve the water quality of the San Joaquin River. While this proposal focuses on relating atmospheric deposition to runoff and relating surface runoff to river water quality (the latter will be accomplished by coordinating with another research project), the next step will be relating the contribution of loads from atmospheric deposition to other pesticide loadings to the River. The specific products listed are appropriate and useful, e.g., technical reports, scientific papers, conference presentations. The generation of the data set and making the data set available through the web will be extremely useful to the regional and broader scientific community. The GIS maps of monthly pesticide use according to crop will also be very useful.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   I am familiar with the track records of the members of the research group from USGS. Their track records are very good and provide confidence that they will produce excellent and useful results from this study. They have produced high quality data sets from other studies and have interpretted the results appropriately. Their publication rates are good and they communicate their results clearly and frequently. They have proven track records of producing well through all outlets mentioned.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The budget seems reasonable to me. My only comment is that the proponents should better justify the use of alternative sampling methods and hence this contribution to the budget.

Miscellaneous comments:

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **235**

Applicant Organization: **US Geological Survey**

Proposal Title: **Atmospheric Deposition of Pesticides to the San Joaquin River Basin**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Excellent	**This project is a method development and application for the analysis of pesticides in the San Joaquin River basin. It is an interesting comparison of field sampling methodologies, but unfortunately lacks an overarching hypothesis to direct the research. A better proposal with direct management implications is warranted for funding in the program.**
XGood	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   This project is a two-year study designed to evaluate atmospheric deposition of pesticides in the San Joaquin basin. The goals of the project, together with specific tasks, are listed. The research project is not however, hypothesis driven. While the transport and deposition of pesticides is an important problem, the PIs have really not set a conceptual framework for the questions that they are trying to answer. I am unsure what the final products will be.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The study is justified, as atmospheric deposition of pesticides from both local and regional sources can have potential adverse effects on the ecosystem. Without a conceptual model, though, it is difficult to see where the investigators are going with this study. Certainly we need to learn more about pesticide transport, but the study is not designed around specific questions. Developing and testing sampling methods is important, but much time could probably be saved by working with others with vast experience in atmospheric deposition of pesticides. I have a feeling that the stainless steel bucket method would be eliminated as a possible sampling device due to the inability to differentiate direct particle deposition and gaseous sorption.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The approach to setting up a research project is presented here, but the approach really lacks a bottom line. I realize that we need to know what atmospheric loading is like for TMDL studies. Im just not sure what the final result will be here. For instance, if the three techniques for estimating dry dep are vastly different, what will be done? Choose one method? Once chosen, what model will be applied to the study results.

   There needs to be a clear-cut hypothesis presented and evaluated. What are the major mechanisms of transport of these two pesticides? Are they more likely to be transported long-range? What is known about gas-particle partitioning and reactions that help us understand what the proper sampling strategy should be?

   There is also no indication of where specific sampling sites are located in the basin. Are contrasting source areas to be tested? What are the mechanisms of transport that one would target?

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   As stated, the project is probably technically feasible, although the first year may entirely be spent on methods development. That doesnt leave much time for sampling and interpretation. Details of aqueous sampling could have been expanded. It is not shown how atmospheric transport and aqueous transport are linked, if they are.

   There is no indication of what form the results would have. Will there be an overall conceptual model?

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   The PIs have presented a fairly reasonable evaluation of performance measures. They incorporate a limited QA section. They do list various milestones that will be reached before taking on the following tasks.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

I am not sure what the products of this research will be, except in the production of high-quality data on sampling methodologies and concentrations of pesticides in various forms of deposition. Shouldnt there be a model with fluxes and accumulation, etc. to pull this all together? This may be a valuable approach, but the PIs need to show reasonable products that can be used by management concerns.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The PIs appear to have the experience to complete the research tasks. The link with the USGS National Lab is certainly a strength of this proposal. I do hope that the sample turnaround time at that busy laboratory will enable completion in a timeframe such as this project.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Pesticide analyses are expensive and therefore make up a significant portion of this proposal. It is therefore imperative that the study design is optimal for the costs. In its current state, the project is an expensive method development study. With link to a conceptual model and interpretation, it could be worth the cost.

Miscellaneous comments:

External Scientific: #4

Research and Restoration External Scientific Review Form

Proposal Number: **235**

Applicant Organization: **US Geological Survey**

Proposal Title: **Atmospheric Deposition of Pesticides to the San Joaquin River Basin**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**Important study, will provide critical missing data to the subject of pesticide contamination in the state's surface water. Authors have strong credentials of success in closely related studies. Results can be immediately applied to lessening non-point source contamination of the San Joaquin river, delta, and Bay.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   Goals are clearly stated and internally consistent in so far as the immediate question is concerned, namely, what contribution does atmospheric deposition make to the pesticide loading in the San Joaquin River, given that a major, already identified source, is runoff from sprayed areas (orchards, fields, cities etc). This is a timely concept because the knowledge to be generated can direct agency efforts toward mitigating inputs, ie, place all/major effort on preventing surface runoff, or put all/major effort into minimizing atmospheric contamination with pesticides.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project

justified?

In general the study is well justified. River water regularly approaches/exceeds toxic thresholds for indicator species because of their content of pesticides of the type to be studied here. And atmospheric water (rain, fog) collected in the general vicinity is shown to exceed toxic thresholds, and be contaminated with the same pesticides (plus other toxicants). But the question of how much of the atmospherically-derived contaminant gets into the river has not been addressed, at least not in the detail proposed here. The San joaquin Valley is a good choice for this study becauise the usage of pesticides in the SJV is high relative to other areas, and the river drainage system is well defined and already shown to be impacted.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   Wet and dry deposition samples of pestices will be collected in surrogate surfaces (soil, foam) and in conventional bucket-type samplers. The amounts in these media will be determined, as will the postential for addition to runoff during storm events for the soil surfaces. The proposal is distracting at this point because of the variety of different sampling tools to be selected. Reviewer recommends that authors pick out the 2 or 3 media that they think will be most useful, and deploy these over more sites, rather that using just 2 sites with multiple sampling media. Then show how a comparative study of variation with time and location be done.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The authors have used this approach, in variation, in prior sampling studies, including in the Mississippi River basin. Technical feasibility is good, given that prior record. Success would be enhanced if the study focussed on the major objectives, and less 'side-project' evaluation of methods. More locations would be preferable, and a better description of statistical evaluation in the project design would be important to insuring success. the scale of the project is somewhat limited--to the lower San Joaquin Valley. One might wonder what contribution atmospheric deposition in the surrounding hills/mountains that feed the SJR might make, relative to the more proximate deposition occurring in the Valley itself.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   Authors outline a reasonable approach to data interpretation on page 10, but few details are provided. Again, statistics do not appear appear in the dicussion of the design and interpretation. Pesticide use pattern mapping is good, but how will that information be used in interpreting the data? Why include a sidelight note about studying pesticide degradation in soil? That has already been studied extensively, and if there are aspects that haven't, a separate study just of that would be justifiable. I have no question that the authors will get a lot of valuable data, and fill all or most of their objectives. But my confidence is based as much on their prior demonstrated accomplishments as on what is contained in this section of the proposal.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   USGS Water Water Resources Investigation Reports will be prepared. This will insure that the data be disseminated to agencies that are able to take actions based upon the findings. The authors should perhaps plan more specifically how the findings can have impact on regulations and policy. The Air Resources Board is not mentioned at all, even though ARB has a Scientific Review process that might propose concrete steps to minimize air contamination with pesticieds. DPR is mentioned, but only as a source of use information. DPR has a scientific review body also that could be a recipient of the data, and see that steps are appropriately implemented. How all this would fit together, at the state and federal level, could benefit from more discussion in the proposal.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   Excellent track record. Dr. Majewski has demonstrated accomplishments in all technical aspects of the proposal during over 15 years with USGS, ARS, and the University. He also has an excellent record of publishing his results in reports, books, journal articles, etc. The USGS has most of the capability needed at their Sacramento locaction. For those aspects, such as 'fat bag' extraction, they have the appropriate linkages with others (USFWS, private companies). It is appropriate to see the active involvement of the CVRWQCB, which will be in a position to implement some steps aimed at mitigating contamination.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The work proposed here is expensive, and the budget ($725,350) reflects that. Perhaps by focussing the project as noted some savings could result. But it is doubtful that it could be decreased below $500,000, without USGS assuming more cost-sharing. That may not be possible given their annual budget. It isn't clear in the budget how the authors distributed between USGS labor and the cost of analysis. Wouldn't USGS labor include that of the analytical chemists doing the bulk of the analyses?

Miscellaneous comments:

This is an important study that should be funded by Cal-Fed. But the authors should be asked to be more specific in areas alluded to in the review before the study is undertaken. This will help to avoid the pitfall of many monitoring efforts, which get so engulfed in taking and analyzing samples that they sometimes miss asking the critical questions addressing the design of the study and its likely outcomes. This project holds promise of providing critical data to the whole question of pesticide contamination in the Valley, extending to 'downstream' areas of the delta and SF Bay. It can also be a model for similar studies in other sensitive river areas of the West. My comments are along the line of making this as good a study as it possibly can be, gien the importance and liklihood of replication elsewhere.

Environmental Compliance:

Proposal Number: 235

Applicant Organization: US Geological Survey

Proposal Title: Atmospheric Deposition of Pesticides to the San Joaquin River Basin

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   XYes **-**No

   If no, please explain:

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   XYes **-**No

   If no, please explain:

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   -Yes **X**No

   If yes, please explain:

Other Comments:

Budget:

Proposal Number: 235

Applicant Organization: US Geological Survey

Proposal Title: Atmospheric Deposition of Pesticides to the San Joaquin River Basin

1. Does the proposal include a detailed budget for each year of requested support?

   XYes **-**No

   If no, please explain:

2. Does the proposal include a detailed budget for each task identified?

   XYes **-**No

   If no, please explain:

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

   XYes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   XYes **-**No

   If no, please explain:

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

   -Yes **X**No

   If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

   Cost share of $20K and rounding of total figures may contribute to differences in project total budget numbers.

6. Does the budget justification adequately explain major expenses?

   XYes **-**No

If no, please explain:

7. Are there other budget issues that warrant consideration?

   -Yes **X**No

   If yes, please explain:

Other Comments:

Verify applicant can comply with State standard contract provisions.